

CHM 1025 Practice Questions – Chapters 9, 10 & 13

Chapter 9

- Which of the listed types of electromagnetic radiation has the longest wavelength?
 - Ultraviolet
 - X-Ray
 - Infrared
 - Microwaves
- Which electron transition in the Bohr model would produce light with the longest wavelength?
 - $n=2 \rightarrow n=1$
 - $n=3 \rightarrow n=1$
 - $n=4 \rightarrow n=1$
 - $n=5 \rightarrow n=1$
- How many valence electrons does tellurium (Te) have?
 - 5
 - 6
 - 16
 - 52
- Which property decreases as you move down a column in the periodic table?
 - Atomic size
 - Ionization energy
 - Metallic character
 - None of the above
- Write the electron configuration for arsenic (As)

Chapter 10

- Draw the Lewis structure for hydrogen peroxide
- Draw the Lewis structure for calcium chloride
- How many resonance structures can be drawn for the nitrite ion? (N and O must obey the octet rule)
 - 1
 - 2
 - 3
 - 4
 - 5

4. What is the electron-domain geometry and molecular geometry of carbonate?
 - a. Tetrahedral, trigonal planar
 - b. Tetrahedral, trigonal pyramidal
 - c. Trigonal pyramidal, trigonal pyramidal
 - d. Trigonal planar, trigonal planar
 - e. Tetrahedral, tetradedral

5. Classify the following bonds as nonpolar, polar, or ionic:
 - a. The bond in ClF
 - b. The bond in CsBr
 - c. The carbon to carbon bond in C₂H₄

Chapter 13

1. A 200-gram solution of alcohol contains 180 g of water. What is the mass percent of alcohol?

2. What mass of NaF must be mixed with 25 g of water to create a 3.5% by mass solution?

3. How many grams of Ca(OH)₂ are needed to produce 500. ml of 1.66 M Ca(OH)₂ solution?

4. If 65.5 ml of HCl stock solution is used to make 450.-ml of a 0.675 M HCl dilution, what is the molarity of the stock solution?

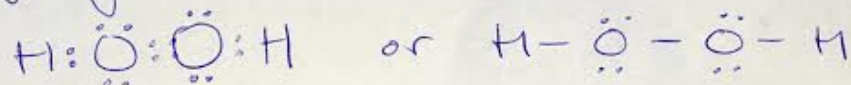
5. How much 0.155 M NaOH solution do we need to completely neutralize 0.235 L of 0.275 M H₂SO₄ solution?

Chapter 9 answer key:

1. D
2. A
3. B
4. B
5. $[\text{Ar}] 4s^2 3d^{10} 4p^3$

Chapter 10 ATM Review Questions & Answers

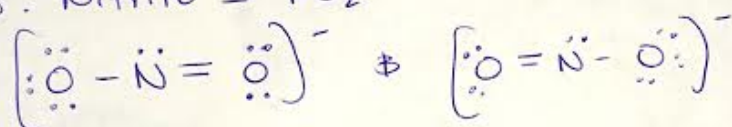
1. Hydrogen Peroxide = H_2O_2



2. Calcium Chloride = $CaCl_2$



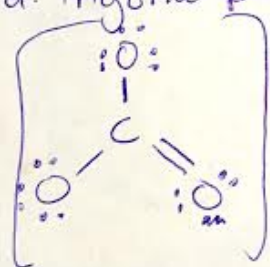
3. Nitrite = NO_2^{-}



b. 2

4. CO_3^{2-} = carbonate

d. trigonal planar, trigonal planar



3 bonding domains
0 nonbonding domains

5. a. polar
b. ionic
c. nonpolar

Chapter 13 Answer Key

1. 10.0%
2. 0.91g
3. 61.5g
4. 4.64M
5. 0.834L

Chapter 13

mass % = $\frac{\text{mass solute}}{\text{mass solution}} \times 100$

$D = \frac{\text{mass}}{\text{volume}}$

1) $\frac{(200g - 180g)}{200g} \times 100 = 10.0\%$

$19/mL = \frac{x}{180 mL}$
 $180g = x$

2) $\frac{x}{(x+25)} \times 100 = 3.5$
 $x \times 100 = 3.5(x+25)$
 $x \cdot 100 = 3.5x + 87.5$
 $96.5x = 87.5$
 $x = 0.91g$

3) $0.50L \times \frac{1.66 \text{ mol}}{L} \times \frac{74.093g \text{ Ca(OH)}_2}{1 \text{ mol}} = 61.5g \text{ Ca(OH)}_2$

4) $M_1 = \frac{M_2 V_2}{V_1} = \frac{(0.675M)(450mL)}{65.5 mL}$
 $M_1 = 4.64M$

$M_1 V_1 = M_2 V_2$
 $V_1 = 65.5 mL$
 $V_2 = 450 mL$
 $M_2 = 0.675M$
 $M_1 = ?$

5) $H_2SO_4(aq) + 2NaOH(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(l)$
 $0.235L H_2SO_4 \times \frac{0.275 \text{ mol } H_2SO_4}{1 L} \times \frac{2 \text{ mol NaOH}}{1 \text{ mol } H_2SO_4} \times \frac{1 L}{0.155 \text{ mol NaOH}}$
 $= 0.834 L \text{ NaOH solution}$